

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Original) A polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15.
2. (Original) A polypeptide according to claim 1, which polypeptide is a functionally altered mutant of flavin-containing monooxygenase 3 (FMO3) leading to a buildup of trimethylamine in an animal.
3. (Original) A polypeptide according to claim 2 resulting from a deletion, insertion, non-sense, or mis-senses mutation in a FMO3 gene.
4. (Original) A polypeptide according to claim 3 which is the R238X variant of the bovine FMO3.
5. (Currently Amended) An isolated nucleic acid sequence encoding a polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15 according to any of claims 1-4, or the complement thereof.
6. (Original) An isolated nucleic acid sequence according to claim 5 which is the nucleic acid sequence shown in SEQ ID NO:14.

7. (Currently Amended) An isolated nucleic acid sequence comprising at least a portion of a nucleic acid sequence encoding a polypeptide of claim 1 ~~any of claims 1-4~~, and up to 500 kb of a 3' and/or a 5' adjacent genomic DNA sequence, or the complement thereof.

8. (Currently Amended) A nucleic acid fragment selected from the group consisting of:

- (a) a specific fragment of a nucleic acid sequence encoding a polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15 ~~according to any of claims 1-4~~,
- (b) a specific fragment of a nucleic acid sequence according to claim 7,
- (c) SEQ ID NO:9,
- (d) SEQ ID NO:10,
- (e) SEQ ID NO:11,
- (f) SEQ ID NO:12,
- (g) SEQ ID NO:16,
- (h) SEQ ID NO:17, and
- (i) SEQ ID NO:18.

9. (Currently Amended) A set of primers for amplifying a nucleic acid sequence ~~according to any of claims 5-7~~, comprising at least one primer selected from the group consisting of the nucleic acid fragments according to claim 8.

10. (Currently Amended) A method for detecting a mutation in the FMO3 gene in an animal, with the exception of humans, where the mutation will cause an alteration in the metabolism of trimethylamine leading to a fish off-flavour in a food product of the animal or its offspring, wherein the method comprises:

- (a) obtaining a sample of genomic DNA from the animal,

- (b) amplifying a segment of said DNA spanning a polymorphic marker by PCR using:
  - (i) a set of primers according to claim 9,
  - (ii) a set of primers which specifically hybridise under stringent conditions with a nucleic acid sequence encoding a polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15 according to any of claims 1-4, or
  - (iii) a set of primers which specifically hybridise under stringent conditions with a nucleic acid sequence according to claim 7 comprising at least a portion of a nucleic acid sequence encoding said polypeptide, and up to 500 kb of a 3' and/or a 5' adjacent genomic DNA sequence, or the complement thereof, and
- (c) detecting in said amplified DNA the presence of an allele of a polymorphic marker associated with said mutation in the FMO3 gene.

11. (Currently Amended) A method for detecting a nucleic acid sequence comprising a mutation in the FMO3 gene of an animal, with the exception of humans, where the mutation will cause an alteration in the metabolism of trimethylamine leading to a fish off-flavour in a food product of the animal or its offspring, wherein the method comprises:

- (a) obtaining a nucleic acid sample from the animal; and
- (b) determining the presence in said nucleic acid sample of a nucleic acid sequence encoding a mutated FMO3 polypeptide.

12. (Currently Amended) A method for detecting a nucleic acid sequence according to claim 11, wherein said nucleic acid sequence is detected by

- (a) contacting said nucleic acid sample with a nucleic acid probe spanning said mutation under conditions of specific hybridisation between said probe and the mutant sequence to be detected; and
- (b) detecting the hybridisation complex.

13. (Currently Amended) A method according to claim 11, ~~or 12~~ wherein the presence of the nucleic acid sequence encoding said mutant polypeptide is determined by contacting the nucleic acid sample with a nucleic acid fragment selected from the group consisting of:

(i) a specific fragment of a nucleic acid sequence encoding a polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15,

(ii) SEQ ID NO:9,

(iii) SEQ ID NO:10,

(iv) SEQ ID NO:11,

(v) SEQ ID NO:12,

(vi) SEQ ID NO:16,

(vii) SEQ ID NO:17, and

(viii) SEQ ID NO:18 ~~according to claim 8, a nucleic acid fragment which specifically hybridises under stringent conditions with a nucleic acid sequence encoding a polypeptide according to any of claims 1-4, or a nucleic acid fragment which specifically hybridises under stringent conditions with a nucleic acid sequence according to claim 7.~~

14. (Currently Amended) A method according to claim 11 ~~or 12~~ which further comprises PCR amplification from the nucleic acid sample, of a sequence comprising at least the portion of the FMO3 sequence wherein the mutation is to be detected.

15. (New) A method according to claim 11, wherein the presence of the nucleic acid sequence encoding said mutant polypeptide is determined by contacting the nucleic acid sample

with a nucleic acid fragment which specifically hybridises under stringent conditions with a nucleic acid sequence encoding a polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15.

16. (New) A method according to claim 11, wherein the presence of the nucleic acid sequence encoding said mutant polypeptide is determined by contacting the nucleic acid sample with a nucleic acid fragment which specifically hybridises under stringent conditions with (i) a nucleic acid sequence comprising at least a portion of a nucleic acid sequence encoding a polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the polypeptide sequence SEQ ID NO:15, and up to 500 kb of a 3' and/or a 5' adjacent genomic DNA sequence, or (ii) the complement thereof.